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RECOGNITION OF SPOKEN COMMENTS BY A TEACHER IN A LEARNING SITUATION AS RELATED TO CHILDREN'S PERSONALITY AND LEARNING. FINAL REPORT

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Some 96 fourth-grade boys participated in a study investigating the influence of personality and stimulus characteristics on perceptions of the meanings of verbal evaluations, and the functioning of differentially perceived evaluations as reinforcers in a learning task. Personality variables measured were anxiety, locus of control, need for approval, and need for achievement. Measures of reinforcer perceptions were obtained in two experimental sessions, each using 36 taped comments encompassing all combinations of three levels of content (positive, neutral, and negative) and three levels of intonation (pleased, indifferent, and displeased). In another session, subjects were given a concept learning task with reinforcers selected from the earlier session. One control group was reinforced with "excellent," an evaluation previously perceived as very positive; a second control group was reinforced with "pretty bad," previously perceived as very negative. A common reinforcer was used for the two experimental groups ("I see"); subjects in the first group previously had perceived it as positive, those in the second, as negative. Content, intonation, and locus of control were all found to be related to perceptions of the reinforcers. Evidence was also obtained that perception of a reinforcer related to its effects on learning. Implications for education were discussed. (Author)

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Recognition of Spoken Comments by a Teacher in a Learning Situation as Related to Children's Personality and Learning

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Institute for Juvenile Research

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Preface

The data on which this report is based were collected in Homewood, Illinois. The investigators wish to express their appreciation to Elmer H. Schultz, Superintendant of the Homewood School System, and to John W. Betts, principal of Churchill School, to Jerry L. Parker, principal of Willow School, and to the fourth-grade teachers at these schools for their cooperation and assistance during the various testing phases of the project.

SUMMARY

Despite the widespread use of verbal evaluations in social situations in general and the school-room in particular, little is known about what determines the effectiveness of these evaluations in modifying behavior and influencing learning. Starting with the hypothesis that perception of the meaning of an evaluation may be an important determinant of its effectiveness as a reinforcer, a study was designed to investigate the following questions: Do characteristics of a verbal evaluation, such as content and intonation, determine what meaning the listener attributes to it? Do different children perceive the same evaluation differently? If such differences exist, are they related to personality variables, specifically anxiety, need for approval, need for achievement and locus of control? Do differences in perceptions of verbal evaluations relate to the effectiveness of the evaluations as reinforcers?

Ninety-six fourth grade boys took part in the study. In initial group sessions, they were given tests measuring each of the personality variables. Following this, each child participated in two individual experimental sessions designed to obtain measures of his perceptions of various reinforcers. In both sessions, 36 taped evaluations were used, the content and intonation of which were systematically varied in the following way: there were 12 statements, four of which had positive content, four neutral and four negative; each statement was spoken with three different intonations - pleased, indifferent, and displeased.

In session A, the child was told that the taped comments represented an art teacher speaking to various students about their work. After each comment was played to him, he was asked to respond on five-point scales to three questions, concerning the teacher's opinion of the child's work, the child's feeling after the comment, and the teacher's liking for the child.

In session B, the child was presented with a guessing game task in which he was asked to assess his performance (i.e., tell whether he had guessed correctly or incorrectly) on the basis of the taped evaluation played to him after each guess.

In a final experimental session three statements used in sessions A and B were selected to serve as reinforcers in a concept learning task, in an attempt to see if the subjects' perceptions predicted their reactions to the reinforcers in this situation. Two experimental groups received the same reinforcer in this session ("I see" said with negative intonation). Subjects assigned to the first experimental group had previously perceived this as positive; those assigned to the second experimental group had perceived it as negative. There were also two control groups, the first receiving a reinforcer which they had perceived as very positive ("excellent"); the second, one perceived as very negative ("pretty bad").

School records were used to obtain grades and achievement and intelligence test scores for each subject.

Analysis of the results of the study showed that perceptions were influenced by content to a very great extent, and by intonation to a lesser extent. A content by intonation interaction was obtained, in which neutral intonation appeared to weaken (or "flatten") the effect of non-neutral content.

Attempts to relate personality variables and intelligence to the reinforcer perceptions showed that only locus of control, a variable which measures the degree to which one feels responsible for what happens to him, related positively to perceived meaning; children with a strong sense of responsibility saw the evaluations as more positive.

Because these personality variables did not adequately account for the consistent differences in perceptions which were found between children, it was suggested that parental styles of reinforcement should be investigated as probable determinants of these perceptual differences.

A derived measure, "content-intonation sensitivity", showed a wide range in the relative importance of content and intonation to different subjects' perceptions (although very few were more influenced by intonation than by content); this measure was found to be significantly related to anxiety, so that highly anxious children were relatively more sensitive to intonation and less anxious children more sensitive to content.

The results of the third session, in which the link between reinforcer, perception, and learning was to be determined, were marred by a strong dimension preference in the concept formation. Looking at the data in several ways partially obviated this problem, however, and suggested that there was evidence that perception of the evaluation does affect the influence that evaluation has on subsequent behavior. Thus, the same statement may have the effect of either increasing or decreasing behavioral responses for different children, consistent with whether they perceive the statement to be positive or negative.

The degree to which the present results can be generalized to classroom situations cannot be known without additional research. It can be pointed out that children in classrooms have the opportunity to become familiar with teachers' reinforcement styles, while those in the present study were responding to comments of an unfamiliar, disembodied voice. These facts might lead one to expect a smaller amount of variation between children in perceptions of various evaluative statements of teachers in classrooms. If, however, further research shows that these results, particularly with regard to perceptual variation, do generalize to classrooms to some degree, certain implications for educational practice will be plausible. It might be inferred, for example, that a

teacher, when speaking to a class as a whole, might increase the likelihood that all the students would interpret her evaluation statements in the same way by using either very positive or very negative statements with matching intonation; and that she should take special care with comments intended to be noncommital, for some students might interpret them as praise, others as criticism. It might also be inferred, perhaps most appropriately, that the teacher should attempt to learn how each child interprets her evaluations, in order to be able to convey her precise intended meaning to each one. Although this last suggestion would be the most difficult to implement, attention to this problem could well result in more effective teaching.

INTRODUCTION

Statements of verbal evaluation comprise a sizeable proportion of speech. We may assume that those who produce such statements usually have implicit expectations about how they will affect the people to whom they are directed. The use of verbal evaluations is especially widespread and important in schools, where teachers attempt to bring about desired behavior by praising, scolding, or simply informing students about the adequacy of their work. Some teachers seem to assume that different students will respond identically to the same statement of evaluation, and that these responses will correspond to the intended meaning, whether positive, negative or neutral. Other teachers, apparently expecting or perceiving some variation among children, use different evaluation statements to influence different students.

Research dealing with the effects of verbal evaluations or reinforcers has for the most part ignored the possibility of individual differences in response to such evaluations. (See reviews by Stevenson, 1965; and Parton and Ross, 1965). Bijou and Baer (1963), who have contended that research in this area has been inconclusive and contradictory because of such omissions, believe that the effect of particular social reinforcers may vary widely from child to child:

> Social reinforcers tend to be different stimuli for different children - approval is a positive reinforcer for one child, a negative reinforcer for a second, indistinguishable from any form of attention for a third, and a neutral stimulus for a fourth. The second child may respond to disapproval as a positive reinforcer; the third child may respond to attention, approval, disapproval, affection, anger or reflection of feelings as equally effective positive reinforcers; the fourth child may respond to no social stimuli as functional. (1963, pp. 211-212).

Those studies which have investigated relationships between certain

individual difference variables and subjects' responses to particular social reinforcers have presented some evidence that such personality characteristics as dependency, anxiety and need for approval relate to verbal conditioning or probability learning with such verbal reinforcers as "good", "fine", and "uh-huh". Little attempt has been made, however, to demonstrate the mechanisms which mediate such effects.

Intervening processes have sometimes been suggested as explanations of the connection between reinforcers and learning outcomes in verbal conditioning research (e.g. Dulaney, 1961). One variable which has been investigated in several studies, and which can be considered such an intervening process, is the subject's "awareness" of the connection between the reinforcer and the reinforced response; however there is little agreement about the role of awareness in such research (Levin, 1961; Spielberger, Levin and Shepard, 1962; Oakes, 1967; Thaver and Oakes, 1967; Baer and Goldfarb, 1962; Wong, Harrison and Stopper, 1966). A smaller number of studies have studied the subjects' perceptions of the meanings of reinforcers as conditioning or intervening variables. In one, a verbal conditioning experiment by Mandler and Kaplan (1956), the subjects were asked at the end of the experiment for their perception of the meaning of the reinforcer used ("mm-hmm"). Those who perceived it as positive had increased the reinforced behavior, while those who perceived it as negative had decreased the reinforced behavior. A similar study by Cairns and Lewis (1962) also included measures of dependency and found that high dependent subjects tended to hear "mm-hmm" as pleasant, while low dependent subjects heard it as unpleasant or neutral. Those who considered it positive also showed significantly greater conditioning.

A sizeable body of research has accumulated relating the effects of variations in types and schedules of social reinforcement (verbal and non-verbal) on children's performance in different learning tasks (Crandall, Good and Carndall, 1964; Gewirtz and Baer, 1958; Hill and Stevenson, 1965; Kelly and Stephans, 1964; Antonitis, Frey and Baron, 1964; Walters and Foote, 1962; Zigler and Kanzer, 1962; Travers, VanWagenen, Haygood and McCormick, 1964; McCoy and Zigler, 1965). One particularly interesting study, reported by Wiener (1966), related race and social class differences in children to the effectiveness of two types of reinforcers; statements of approval accompanied by positive intonation, and statements of approval accompanied by flat or neutral intonation. Middle-class, white children learned equally well under either condition, while lower-class Negro children learned only under the condition in which both content and intonation were positive. These results were thought to reflect cultural differencies in experience with use of these two "communication channels", eventuating in perceptual differences between the two groups. The children's perceptions of the meanings of the reinforcers were not actually measured, however. In another study, conducted by Mehrabian and Wiener (1967), verbal stimuli were used which encompassed all combinations of three levels of content and three levels

of intonation (positive, neutral and negative in each case). The subjects were asked to judge the speaker's attitude from the verbal stimuli (a judgment which can be considered one kind of perception). The stimuli were not presented as reinforcers, although several of them could easily be construed as such. It was found that intonation was a more important determinant of judgment of speaker attitude than was content.

In summary, there is some evidence which indicates that personality characteristics relate to responsiveness to particular verbal reinforcers, that the perceived meaning of the reinforcers may relate to such responsiveness, and that content and intonation may affect responsiveness to and perception of verbal statements.

The investigation to be reported here is based on the assumption that the effect of verbal reinforcers is mediated through the perceived meanings of the reinforcers; it represents an attempt to unify the findings discussed above by combining variables previously studied separately in disparate research areas.

The major objective of this investigation was to explore possible antecedents and consequents of differences in children's perceptions of verbal reinforcements. It was hoped that we might discover whether different children perceive the meaning of certain verbal reinforcers differently; whether such differences can be accounted for in part by differences in certain personality characteristics; whether certain stimulus characteristics (content and intonation) of the verbal reinforcer contribute to differences in the perceptions; and whether differences in perception relate to performance differences when the same reinforcements are used in learning tasks.

It was expected that individual differences in perception would be maximized under conditions in which content and intonation were neutral or contradictory, and minimized under conditions in which both were positive or both negative, since as statements' ambiguity decreases, the perceptual variation which independent variables might influence must also decrease. Four personality-related characteristics were selected which seemed most likely to be related to differences in reinforcer perceptions; these were anxiety, need for achievement, locus of control, and need for approval. The following general predictions were made:

1. Anxiety. More anxious children were expected to be more likely to perceive negative meanings in the reinforcements. This hypothesis was based on the assumption that anxiety produces a sensitization to frightening or painful events as a means of protecting against them.

2. Need for Achievement. Children with higher nAch scores were expected to be more likely to perceive positive meanings in the reinforcements. Since positive reinforcements are indications to the child that he is achieving well, the perceptions of those who have this need relatively strongly should be oriented in the positive direction.

3. Locus of Control. This refers to the degree to which the child considers himself, as opposed to some other person or thing, responsible for the positive and negative reinforcements which he receives. A child who believes he can control his own reinforcements should be more likely to expect them to be as he wishes them; therefore those who score higher on this variable should have more positive perceptions of the reinforcements.

4. Need for Approval. Two conflicting hypotheses can be made for this variable. On the one hand it might be expected that children with stronger need for approval should attempt to perceive approval in the reinforcements which they receive, and therefore should have more positive reinforcement perceptions. On the other hand, children scoring high on a need for approval measure have been shown to have low expectancies for social and academic success (Crandall, 1966); this might lead one to predict a negative relationship between need for approval and positivity of reinforcer perception.

METHODS

The subjects for this study were fourth grade boys from two schools in a middle-class Chicago suburb. The first three sessions of the study took place in the spring of 1967, with 96 boys participating; 48 of these subjects were seen the following fall for a fourth session.

The initial session was designed to obtain measures of the four personality variables selected for the study. The subjects were divided into three groups, and two experimenters (the authors) administered the following tests to each group separately: the Children's Manifest Anxiety Test (Castaneda, McCandless and Palermo, 1956), the Children's Social Desirability Questionnaire (a measure of need for approval described in Crandall, Crandall and Katkovsky, 1965), a test of Intellectual Achievement Responsibility (measuring children's locus of control and described in Crandall, Katkovsky and Crandall, 1965), and a scale of Achievement-related Affect (developed by the investigators as a measure of need for achievement, and described in Appendix A). The tests were put into two booklets, one containing the IAR and Social Desirability questionnaires, the other containing the Anxiety and Achievement-related Affect measures. To insure that the subjects understood the questions, one experimenter gave the instructions and then read the questions aloud, one by one, as the boys marked their answers in the booklet. In addition to these measures, IQ, school grades and achievement test scores were obtained from school records for each subject.

Soon after the initial session, subjects took part in two experimental sessions designed to measure their perceptions of verbal reinforcers. The order in which the sessions were presented to each subject

was varied, so that about half the subjects experienced session A first and half session B. Regardless of the order, a two to three week time period separated the two sessions, both of which were conducted by the same female experimenter. Session A attempted to assess the child's perception of a series of "vicarious reinforcers" (not directed to him), while in session B, his perceptions of reinforcers which concerned his performance and were directed to him were obtained. The former allowed a more finely graduated response scale, while the latter seemed more relevant to typical reinforcement situations.

Each session used a series of reinforcers, or verbal evaluations, which included all combinations of three levels of content (positive, neutral and negative) and three levels of intonation (pleased, indifferent and displeased). There were four different statements for each content level, each repeated once with each of the three types of intonation, for a total of 36 reinforcers. In order to allow a check for reliability, half of the statements for each content category were identical for sessions A and B; the decision about whether a reinforcer was to appear in both sessions, in A only, or in B only, was based on the experimenters' judgment as to the appropriateness of the reinforcer in the context of the session. (Appendix B contains a more detailed description of the method of selection of the reinforcers and a list of the reinforcers used in the two sessions.)

Tape recordings were made of the two lists in order to keep the stimuli constant for the different subjects. The voice on the recordings was that of a local actress. Three different orders of the 36 reinforcers within each series were made so that it would be possible to check on order effects. These orders were randomly generated with constraints to avoid adjacent appearances of two items in the same content and intonation categores, two items with identical contents, or three items in the same content categories or in the same intonation categories. The items in each order were copied from the same original recordings. Each order was presented to about a third of the subjects in each session.

In session A, the subject was brought to a small room in his school and seated at a table across from the experimenter. He was told that he was going to hear comments made by a teacher to different students during an art class, and that after hearing each one, he would be asked to answer three questions, each with five possible answers: "What did the teacher mean? ... The drawing is: 1) very bad; 2) sort of bad; 3) so-so; 4) pretty good; 5) very good." How does the child feel? ... He feels: 1) very unhappy; 2) sort of unhappy; 3) neither way especially; 4) pretty happy; 5) very happy." "Does the teacher like or dislike the child? ... The teacher: 1) dislikes him very much; 2) dislikes him a little; 3) neither likes nor dislikes him; 4) likes him a little; 5) likes him very much."

The child was presented a copy of each question and its possible answers for reference during the session, and after a practice example was given to make certain that the subject understood the rating procedure (with "not so good" spoken by E as the reinforcer), the 36 taped comments were played to him, one at a time, and his three ratings for each comment were obtained immediately after he had heard it. These ratings were made verbally to the experimenter, who then recorded them.

Session B was designed to get measures of the children's perceptions when the reinforcing experience involved them more directly. For this, it was necessary to devise a task in which the child actively participated, and yet received no feedback about his performance other than that provided by the reinforcer. The following "game" was devised to fit these requirements.

A tape recorder was enclosed, and concealed, in a 20"x20"x10" hardboard box, painted blue. On the front of the box were the words, "GUESS IT GAME", a small cloth-covered speaker opening, a signal light above three small buttons (on the left), and two buttons, labelled "wrong" and "right" (on the right). On the back of the box were lights which were lit by the buttons on the front, a button to light the start signal, and a switch to start and stop the tape recorder; these enabled the experimenter tooperate the apparatus and record the subject's responses.

Each child was told that this was a new game, the Guess it Game. When the light came on, he was to guess which of the three buttons on the left was the correct one to press. Following his choice, the game "commented" about his guess. After listening to the comment, the subject was to indicate whether he thought his guess had been correct or incorrect by pressing the "right" or "wrong" button. When the experimenter had given two "practice turns", for which "right" and "no" (with neutral intonations) were the taped reinforcers, and the subject appeared to understand the procedure, the "game" began, and continued until all 36 experimental comments, or reinforcers, had been played. For each comment, the experimenter recorded two measures: the subject's judgment of right or wrong, and the time between the end of the recorded comment and the subject's response (latency); the latter measure was obtained with a stopwatch.

The purpose of the final session was to learn whether a subject's perception of a reinforcer would predict the effect of the reinforcer on his performance in a learning task. Because the selection of reinforcers for this session depended on some analysis of the results of sessions A and B (which had occurred near the end of the spring school semester), there was a delay of several months, until well into the following fall semester, before this final session was run. Only 48 of the original 96 subjects participated in this last phase of the experiment; this reduction was necessitated by some subjects' having moved

during the interval and others failing to meet the criteria established for the task. These 48 subjects were divided into four groups, two experimental and two control, with twelve subjects in each group. The four groups represented four reinforcer conditions, with the reinforcers selected from those used in both of the earlier sessions. The reinforcer used with the first control group was "excellent" said with pleased intonation; all subjects in this group had previously perceived this as highly positive. The second control group's reinforcer was "pretty bad" said with displeased intonation; this had been seen as highly negative by all subjects in this group. The two experimental groups were both assigned the same reinforcer, "I see" said with displeased intonation. Subjects in the first experimental group had previously perceived this as moderately or slightly positive in session A, and as "right" in session B; subjects in the second experimental group had perceived it as moderately or slightly negative in session A, and as "wrong" in session B. (There were no S's who had perceived this as strongly positive or strongly negative, nor was there any other reinforcer which had been seen at the two extremes in sufficient numbers to be used for these experimental groups).

The reason for including control groups with very strongly differentiated reinforcers was so that the function of these reinforcers might be compared with that of the differentially perceived neutral reinforcer used with the experimental groups. If the learning behavior of the children in the experimental groups were similar to that in the control groups, there would be strong basis for the assumption that the neutral reinforcer was in fact functioning as a positive reinforcer for some children and a negative reinforcer for others.

The learning task was a variant on a concept formation paradigm. The subject responded to a series of stimulus cards, each containing three figures which combined two colors (chosen from red, blue or green) and two shapes (chosen from square, circle and triangle). The figures were aligned horizontally on the stimulus card in such a way that the left-most figure had the same shape as one of the other two figures, and the same color as the remaining one. For example, a stimulus card might contain a red circle (at the left), a red square, and a blue circle. There were 36 such cards, each containing a different combination of form pair/color pair.

The stimuli were presented with an apparatus consisting of a tape recorder enclosed by a 16" square yellow box, on the front of which were three 3"x2½" windows which could be closed simultaneously by a guillotine door on the inside of the box. Beneath the left-most window was an X; each of the other windows had a button beneath it. A small, cloth-covered speaker opening was also on the front of the box. The stimulus cards were inserted behind the windows inside the apparatus; when the guillotine door was raised, a figure appeared in each window.

Each subject was instructed to push the button under the window of the picture that "belonged with" the picture in X. One reinforcer (corresponding to the group to which he was assigned) was also played to him as an example of what "the game might say" to him. (This was to avoid the possibility that some subjects, selecting and retaining a non-reinforced concept, might never hear the reinforcer). The subject was then presented with the stimulus cards, one at a time, until he had responded in the same way (either to color or to shape) six times in a row, or until all 36 stimulus cards had been shown. Based on random assignment prior to the session's start, half the subjects in each group were presented the reinforcer whenever they responded to shape, the other half whenever they responded to color. It was assumed that S's who learned the reinforced concept would be treating the reinforcer as positive, and those who learned the nonreinforced concept would be treating it as negative. Our purpose here was to see how this accorded with their earlier perceptions of the same comments. All responses were recorded by the experimenter throughout the trials.

RESULTS

Reliability and Validity of Measures

Reliability of the perception measure was assessed with a comparison of subjects' responses to the two occurrences of those items which were used in both session A and session B. Table 1 presents percentages of consistent responses across the two sessions for the repeated items, within each intonation condition. Responses to question 1 only were used from session A in this analysis ("What did the teacher mean?") since this question seemed the most comparable to the "right" or "wrong" judgment required of the child in session B. Subjects who scored 3 (neutral) in their responses to the session A question were eliminated from these comparisons because such a response could not clearly be said to be either consistent or inconsistent with the forced "right" or "wrong" of session B. Inspection of the Ns presented in Table 1 indicates that most of the cases omitted in this way fell in the neutral categories, as would be expected. The consistency percentage was computed, for each category, by summing the number of Ss who rated 4 or 5 on question 1 in session A and also judged "right" for the same comment in session B with the number who rated 1 or 2 in session A and judged "wrong" in session B, and dividing by the total number of non-neutral ratings for that item in session A. Table 1 indicates a generally high level of consistency across sessions, with most of the inconsistencies falling in the neutral categories. It is interesting to note that, of a total of 119 sets of inconsistent scores in this analysis, 78% were relatively moderate ratings in session A (2's or 4's), while only 22% were extreme ratings in session A (1's or 5's).

Table 1. -- Percent Consistency of Perceptions between Sess. A, Ques. 1, and Sess. B, Judgment[a]

Reinforcer	Intonation					
	Positive		Neutral		Negative	
	%	N	%	N	%	N
Excellent	100	96	96	90	95	96
Very good	98	96	90	81	95	94
Take your time	63	54	75	40	96	74
I see	81	36	61	31	82	22
Not very good	89	80	92	83	92	87
Pretty bad	94	94	93	87	96	92

[a]Subjects who rated an item as '3' or neutral, during Sess. A were eliminated from the table for that item.

A rough eheck on the validity of the content and intonation manipulations is provided by Table 2, which presents means, for each judgment, for the 12 items in each content condition (averaging across intonations) and the 12 items in each intonation condition (averaging across contents). In every case, the "positive" category was reported as more positive than the "neutral" category, which was more positive than the "negative" category. The differences are much less pronounced for the intonation than for the content categories.

A total score was derived for each of the nine content-intonation cells by summing the four items in each. These total scores were assessed separately by session and used in most of the analyses involving sessions A and B.

Data relevant to assessing the reliability of the personality variable developed for this study, the measure of Achievement-related Affect, are presented in Appendix A. The intercorrelations presented there appear to indicate that several dimensions may be represented in the scale, as presently constituted.

Determinants of Perceptions

Effects on the independent variables were examined in a series of four-way analyses of variance. Each analysis included one personality variable (trichotomized so that the possibility of nonlinear trends could be investigated), the three levels of content, three levels of intonation, and three orders. Dependent variables were the perception scores from each of the three questions in session A, and the perception responses to the game in session B. These were mixed-model analyses of variance, with repeated measures on content and intonation. Techniques described by Winder for computing analyses of variance for data with unequal cell frequencies (1962, pp. 241-244) and with repeated measures on some variables (1962, ch. 7) were utilized in these analyses. It was decided also to examine the possible effect of achievement-related variables on these perception scores. Since the intelligence and achievement measures were highly inter-related (see Appendix C, Table 12), IQ was selected as the most general measure of intellectual level. This was trichotomized and used in 4-way analyses, just as the personality variables were.

The complete results of these analyses are presented in Appendix D, Tables 13-17. Of the five individual difference variables represented in these analyses (including I.Q.), only IAR showed any significant direct effect on perception; children scoring high on this measure tended to respond to question 1, session A (What did the teacher mean?") more positively than those scoring low ($F = 4.10$; 2, 87 df, $p < .05$). Means for the three IAR levels are presented in Table 3.

Table 2. -- Means of Content and Intonation Classes on Various Measures

Data Source	Content (Ignoring Intonation)			Intonation (Ignoring Content)		
	Positive	Neutral	Negative	Positive	Neutral	Negative
Sess. A, Ques. 1	17.22	11.59	7.74	12.80	12.14	11.62
Sess. A, Ques. 2	17.12	11.70	7.79	12.88	12.28	11.59
Sess. A, Ques. 3	15.89	12.57	10.61	13.59	13.12	12.36
Sess. B, Judgment	3.74	1.80	.24	2.16	1.89	1.72

Table 3. -- Relationship between IAR and Session A, Question 1 Scores[a]

Mean Score	IAR Groups		
	Low	Medium	High
	11.94	12.28	12.44

[a]From four-way analysis of variance (Table 13, Appendix D), $F = 4.10$, $df = 2$ and 87, $p < .05$

Order was included in these analyses in order to investigate the possibility that it might be producing spurious relationships between other variables or sets of variables whose effects we were interested in. Order showed significant interactions with Social Desirability (session A, question 3; $F = 2.68$; 2, 87 df, $p < .05$) and with Anxiety (session B; $F = 3.69$; 2, 87 df, $p < .05$). Neither of these variables, however, reached significance in their direct effects, although the latter approaches it. Order also showed small, but significant interactions with content in both sessions A and B. However, the content direct effects were so strong, as will be seen presently, that it is obvious that the slight differences produced by the different orders cannot alter the general picture of the content effect.

The content X intonation cell means for sessions A and B are presented in Table 4. In every case, content has a highly significant direct effect ($p < .001$), much stronger than that of intonation, although each of the intonation effects is also highly significant ($p < .001$). The content effect is strongest on responses to the first question of the three asked in session A, while the intonation effect appears to be strongest with question 2 ("How does the child feel?"). (These direct effects can be seen most clearly in Table 2). The content X intonation interactions take somewhat different forms for the different sessions (Table 4). For each of the three questions in session A, positive content is perceived least positively in the neutral intonation condition, and slightly more positively with positive than with negative intonation. Similarly, negative content is perceived least negatively in the neutral intonation condition, while again slightly more positively with positive than with negative intonation. For neutral content, in each of the three questions, positive and neutral intonation are perceived about equally, and each more positive than negative intonation. In session B, intonation shows little effect in the positive and negative content conditions, although in the former it appears that positive intonation is perceived more positively than neutral or negative, which are perceived about equally; while in the latter it appears that negative intonation is perceived more negatively than neutral or positive, which are perceived about equally. The major effect of intonation, however, is apparent in the neutral content condition, where positive intonation is perceived more positively than neutral, which is perceived more positively than negative intonation.

In order to investigate the possible role of personality variables more fully, it was decided to test for linear and quadratic trend effects within the cell which was expected to be most likely to allow personality effects: the cell which combined neutral content with neutral or indifferent intonation. Results of these analyses are presented in Table 18, Appendix D. The only significant effects are, again, with the IAR measure. There is a significant linear trend with responses to session B, judgment (Table 5), with higher IAR scores relating to more positive perceptions. The relationship which was significant in the overall

Table 4. -- Means and Standard Deviations of Content-Intonation Cells

Source	Intonation	Content					
		Positive		Neutral		Negative	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Sess. A Ques. 1	positive	18.13	1.10	12.14	1.48	7.93	1.25
	neutral	15.81	1.88	12.18	1.70	8.54	1.49
	negative	17.60	1.48	10.51	1.59	6.81	1.43
Sess. A Ques. 2	positive	18.11	1.60	12.31	1.76	8.13	1.61
	neutral	15.79	2.08	12.34	1.84	8.67	1.75
	negative	17.28	1.85	10.30	1.95	7.07	1.61
Sess. A Ques. 3	positive	16.75	2.32	12.93	2.17	10.97	2.39
	neutral	14.88	2.33	13.13	2.14	11.24	2.34
	negative	16.01	2.38	11.46	2.15	9.50	2.96
Sess. B Judgment	positive	3.92	.33	2.31	.97	.27	.64
	neutral	3.68	.77	1.73	1.12	.26	.67
	negative	3.63	.84	1.39	.74	.16	.51

analysis, that between IAR and responses to question 1, session A, is reduced to a borderline relationship ($p < .10$) in the present analysis, although the trend is in the same direction.

Table 5. -- Summary of Trend Analysis for IAR Effects on Neutral Cell Scores, Sess. B, Judgment[a]

Mean Score	IAR Group		
	Low	Medium	High
	1.46	1.70	2.02

[a] F linear = 5.24, df = 1 and 87, $p < .05$

The effects of content and intonation on response latencies in session B was also examined with an analysis of variance. Results of this analysis are presented in Table 6. Again, there is a very strong direct effect for content, and weaker, but significant effects for intonation and the content x intonation interaction. Neutral content receives the longest latencies, with the peak in the neutral content - neutral intonation cell. Negative content also receives the longest latencies when combined with neutral intonation, although latencies are almost as long when it is combined with positive intonation. Latencies for positive content are longest when it is combined with negative intonation, and shortest when combined with positive intonation.

In one other set of analyses, the various personality measures were related to a measure of relative sensitivity to content or intonation which was derived from the present data. For each of the three questions from session A, each subject's score for the negative content - positive intonation condition was subtracted from his score for the positive content - negative intonation condition. Subjects with high scores would be relatively more influenced by content, those with low or negative scores would be more influenced by intonation. This was done only for session A because the 5-point scales allowed for more variation in scores. Correlations relating the personality measures and IQ to content-intonation sensitivity are presented in Table 7. Anxiety is significnatly related to this measure for questions 1 and 2, in each case with more anxious children being more sensitive to intonation. In order to test for nonlinear effects, analyses of variance were done with

Table 6. -- Effects of Content and Intonation on Latency of Response in Session B.

Summary of Analysis of Variance				
Source	m.s.	d.f.	F	P
Content	384.53	2	112.76	$< .001$
Con X Sub	3.41	190		
Intonation	19.09	2	6.68	$< .01$
Into X Sub	2.86	190		
Subjects	36.45	95		
Con X Into	12.13	4	4.76	$< .05$
Con X Into X Sub	2.55	380		

Content-Intonation Cell Means			
Intonation	Content		
	Positive	Neutral	Negative
positive	6.53	8.87	7.16
neutral	7.33	9.42	7.32
negative	7.43	8.93	6.66

Table 7. -- Correlations among Content-Intonation Sensitivity and Personality Variables

Personality Variable	Content-Intonation Sensitivity		
	Sess. A, Ques. 1	Sess. A, Ques. 2	Sess. A, Ques. 3
IAR	.03	.09	-.04
Soc. Des.	-.03	.07	-.02
Anxiety	-.24*	-.30**	-.03
Ach-Aff	-.13	.01	.16
IQ	.02	.08	-.02

*$p < .05$
**$p < .01$

the same variables (presented in Table 19, Appendix D). Anxiety again was the only personality variable to show any significant effect: a nonlinear trend with question 3 (Table 8), with moderately anxious children showing the most content-sensitivity, and low or high anxious children, the most intonation sensitivity.

Table 8. -- Relationship between Anxiety and Content-Intonation Sensitivity for Sess. A, Ques. 3[a]

Mean Sensitivity Score	Anxiety Group		
	Low	Medium	High
	4.44	6.75	4.09

[a] From a one-way analysis of variance, $F = 5.70$, $df = 2$ and 93, $p < .01$

Perception and Learning

Percentages of subjects who reached a learning criterion in the final experimental session based on responding to the reinforcers consistently with the way they reported perceiving them in the earlier sessions are shown in the upper portion of Table 9. Thus, 50% of the S's who saw "I see" said with negative intonation as a positive reinforcer in the earlier sessions learned the concept reinforced with this comment in the final session, while 75% of those who earlier saw the same comment as a negative reinforcer learned the concept not reinforced with this comment. Comparison of the various columns of the upper portion of Table 9 shows that the two experimental groups were responding less consistently than were the control groups. A Fisher Exact Test run on the two experimental groups did not show a significant relationship between initial perception of the comment and its later utilization in the learning task, although the trend for the negative perceivers is in the predicted direction.

A reassessment of the reinforcer perceptions was made from the responses to the subject interviews at the end of the final experimental session. All of the 21 subjects in the control groups who saw the statement as an evaluation in that session perceived the meaning to be the same as they had in the earlier sessions; while only 11 of the 16 experimental subjects who saw the statement as an evaluation gave it the same

Table 9. -- Consistency Between Perception and Reinforcer Utilization

	Reinforcer Perception Condition					
	"Excellent," positively perceived (Control)	"I see," positively perceived (Experimental)	"I see," negatively perceived (Experimental)	"Pretty bad" negatively perceived (Control)	Experimental groups, total	Control groups, total
Percent S's consistent between pre-assessed perception and learning	83.33	50.00	75.00	91.67	62.50	87.50
N	12	12	12	12	24	24
Mean no of trials to criterion for consistent responders	6.80	9.83	10.00	6.73	9.92	6.77
Percent S's consistent between post-assessed perception and learning	90.00	75.00	100.00	100.00	87.50	95.23
N[a]	10	8	8	11	16	21
Mean no.of trials to criterion for consistent responders	6.87	7.00	11.25	6.73	9.13	6.80

[a]Subjects whose response to the post-session interview indicated that they did not perceive the statement as an evaluation were eliminated from this analysis.

meaning as in the earlier sessions (68.8%). Results of this reassessment on subject consistency are presented in the lower portion of Table 9. It can be seen that consistency, assessed with respect to the post-session perceptions, is greater for each of the four groups, markedly so for the two experimental groups. Six of the eight S's in the positive perception experimental group (as redefined) learned consistently, while all eight of those in the negative perception experimental group did so. A Fisher Exact Test on these data revealed a relationship significant at the .01 level.

Evaluation of these results is made difficult, however, by the fact that a strong concept preference was found to be operating in this experimental session. As was mentioned, the reinforcers were distributed in such a way that selections according to form would be correct for half the subjects and selections according to color would be correct for the other half. But of the 24 subjects in the two control groups, 21 (or 87.5%) selected form on the first trial, while 19 of the 24 experimental subjects (79.2%) did so. All 5 of the experimental group subjects whose perceptions changed from the earlier sessions to the final session changed in such a way that the meaning of the reinforcer became consistent with their selections on the initial trial. Excluding these five cases from the 16 experimental subjects who saw the statement as a reinforcer (on the grounds that their 'perceptions' may have been justifications or rationalizations) leaves 11 experimental subjects, of whom 10 (or 90.9%) responded correctly in accordance with their earlier perceptions. However, in 8 of these 11 cases, the 'correct' response agreed with the subject's initial selection, or preference. Perhaps the strongest test of the effect of the reinforcers is with those subjects who had to shift from the concept which they initially selected. There were nine such subjects in the control groups; seven of them (77.8%) changed in accordance with the prior perception, while the other two did not consider the statement a reinforcer. In contrast, only three out of eleven such subjects in the experimental groups (27.3%) changed from their initial selections consistently with their original reinforcer perceptions. (Three out of eight, or 37.5%, if the post-session non-perceivers are excluded; and three out of four if those whose perceptions had changed to accord with their initial trial selections are also excluded). To put this slightly differently, of the eight experimental subjects whose initial concept selection was inconsistent with their previous perceptions, four changed the perception to accord with the concept preference, while three changed the concept selection to accord with the prior perception. Of the eight subjects in the experimental group who did not see the comment as a reinforcer, seven did not change from their initial concept selection; four of these were correct. Only for the subjects who had to shift from their initial selection can the effect of the reinforcer be said to be clearly demonstrated. There were three such subjects in the experimental groups and seven in the control groups.

DISCUSSION AND CONCLUSIONS

Although relationships were expected between each of the personality variables and the children's perceptions, it is not surprising that Intellectual Achievement Responsibility was the most predictive of the children's judgments of reinforcers' meanings. The IAR is the only measure which refers directly to reinforcement, assessing whether the child accepts responsibility for reinforcement outcomes of intellectual activity (positive or negative) or attempts to attribute it to external persons or events. A child who accepts responsibility for bringing about his own reinforcements may do so partially because he feels optimistic about the usual outcomes of his behavior; therefore when he receives a reinforcer which is relatively ambiguous, he tends to perceive it as positive.

The only other significant personality-perception relationships which were found in this study occurred between the measures of content-intonation sensitivity and children's manifest anxiety. For the first two questions of session A (concerning the teacher's meaning and the child's feeling) the relationships were linear, with more anxious children being relatively more sensitive to intonation than less anxious children. This seems consistent with theoretical notions concerning the nature and etiology of anxiety. If, as a result of reinforcement history, the anxious child has come to view situations of evaluation as potentially dangerous, he may have learned to investigate such situations carefully, paying attention both to clear and obvious aspects (such as content) and to relatively subtle and indirect aspects (such as intonation), as a protective measure. That "intonation-sensitive" subjects are considering content, as well as intonation, is indicated by the fact that the lowest scores on this measure hovered around zero, reflecting an approximately equal reliance on the two aspects. The other extreme of obtained scores indicated almost complete reliance on content alone. Low anxious subjects pay little attention to intonation in regard to the first two questions, possibly because they feel no such need for vigilance and see content as adequate for judging overt meaning and the child's feeling (based on that meaning). It is only when the question refers to the teacher's liking for the child that low anxious children apparently see intonation as more relevant, possibly because liking must be judged from less explicit connotations (Table 8). It is not clear to the writers, however, why children who are moderately anxious are relatively content-sensitive in response to the liking question.

Just as was indicated by the range found for the sensitivity measure, the relative effect of content was also found to be far greater than the effect of intonation in those analyses which considered the two variables separately. It should be borne in mind that there is no way to equate the content and intonation scales used in this study;

accordingly, it is possible, although it does not seem likely, that the greater effect of content is due only to representation of a greater portion of the possible range.

As might be expected, the analyses of variance show that the content effect is strongest for the question in session A which refers to the teacher's explicit meaning; somewhat unexpectedly, the intonation effect is strongest with the question concerning the child's feelings (rather than the teacher's liking). Even here, however, the content effect is much stronger. This seems contradictory to the finding of Mehrabian and Wiener (1967) that intonation was more important to judgments of speaker attitude than content. It is possible that the difference represents a developmental change (their subjects were college students), with intonation becoming more meaningful at older ages. The discrepancy may also be due to differences between the studies in stimuli, instructions, and evoked responses.

Investigation of the content-intonation interactions in the present study can give some clues as to the functioning of intonation, in relation to content. Considering both sessions and all conditions together, it appears that neutral intonation has a weakening effect on positive or negative content which is equal to or greater than the effect of contradictory intonation. That this effect was greater in session A than in session B may be due to the fact that the judgments were made on 5-point scales in the former situation, but were dichotomous choices in the latter; it is possible that this effect of neutral intonation is relatively slight, and needs the finer scale to be evidenced. Another possibility is that content is relatively more important in the direct reinforcement condition (session B), and that therefore less attention is paid to differences in intonation.

Still, it seems clear that when intonation has an effect which negates or diminishes that of content, it is most likely to be produced by neutral intonation. It seems possible that children, at this age at least, tend to discount intonation when it contradicts content (because it doesn't "make sense"), but to consider neutral intonation to indicate a lack of conviction or enthusiasm in the speaker, and therefore a relatively weaker positive or negative meaning. It is possible that at older ages, intonation which contradicts content may begin to have greater salience (as in sarcasm) and thereby produce different effects.

The response latencies (shown in Table 6) can be considered measures of the amount of difficulty children had with their interpretations of comments in the various content-intonation cells in session B. While the neutral cells were generally the most difficult, cells in which content and intonation were contradictory also showed a high difficulty level (having the longest latencies of the three positive content cells, and a latency only slightly below that of the neutral cell in the

negative content cells). It appears that the children pause and consider the contradictory messages before deciding how much weight to give to the intonation portions. These findings are consistent with many others which have demonstrated that response latencies are longest when stimuli are most ambiguous or equivocal.

Interpretation of the results obtained with the final experimental session is complicated by the discrepancy between the assessments of reinforcer perceptions made in the earlier sessions and those made at the end of the 3rd session and by the strong form preference manifested in this session. While it is possible that the post-session reinforcer assessment represented only accommodations to the performance, there may also be other reasons for these discrepancies. For one thing, the particular reinforcer selected for the experimental groups was presented, in the earlier sessions, in such a way as to force an implicit comparison with the 35 other reinforcers. The perceptions obtained in these situations then, were relative to the particular set of reinforcers in which the one in question appeared, while when this same reinforcer was used in the learning task, it was used alone. Without the presence of the other reinforcers, it may have had a different meaning to some of the children than it did in the earlier sessions. The time lag between the sessions (approximately 6 months) may also have occasioned developmental changes in some of the children, causing differences in specific perceptions. Thus, there are fairly good reasons for using measures of perception from each of the sessions. In addition, post-session measures are comparable to the earlier work in which either perception (i.e. Mandler and Kaplan, 1956) or "awareness" (Spielberger, Levin and Shepard, 1962) have been assessed.

The form preference was not discovered in time to alter the design of the final session. If it had been, the design would probably have been changed so that all children were reinforced in such a way that color would be the correct concept. The test then would be to determine for which children was the perception of the reinforcer strong enough to overcome what is apparently a very strong form preference. This of course was approximated in our reanalyses of the data for this session, which showed that there were three such subjects in the experimental groups and seven in the control groups. Undoubtedly, some of those subjects for whom the correct response coincided with their preference had equally strong perceptions of the reinforcers, but we have no way to determine how many.

Nevertheless, these analyses, taken together, offer some evidence that the same verbal comment, "I see", served as a negative reinforcer for some children, and as a positive reinforcer for others, even though its effect on performance was not as strong as was that of "excellent", a very positive reinforcer, or "that's wrong", a very negative reinforcer. Of course, since the initial perceptions were not as strongly held by

the experimental groups as they were by the control groups, there was no reason to expect that the effect on performance would be as great.

This finding, coupled with the "flattening" effect found for neutral intonation, has relevance for current research in human learning which makes use of verbal reinforcement. Very often these studies use statements with ambiguous content (i.e., "mm-hmm") or statements with positive content (i.e., "good") spoken with a flat intonation as reinforcers. If the chief focus of these studies is learning itself, rather than the reinforcement-performance interaction, the investigators would reduce error variance, possibly to a great extent, either by pretesting to determine the efficacy of the reinforcer to be used, or by using either very positive or very negative statements, spoken with matching intonation. This would reduce the chance of individual differences in perception of the reinforcer occurring which could obscure the process being investigated.

Results of the final session analyses showing that the personality variables here failed to relate either to the experimental groups' perceptions of the neutral reinforcer or to their learning, may seem somewhat inconsistent with some of the results from the earlier sessions. It was expected, at least, that IAR, which showed direct effects on the initial measure of perception, both overall and for the neutral content - indifferent intonation cell, would show a similar effect on the neutral reinforcer used for the experimental groups. There are two differences between these sets of analyses, however; the earlier analyses used the total sample of 96 and used, as dependent variables, total cell perception measures summed across the four items in each cell, while the later one used only one-fourth of the original sample and measured perception with a single item. If the personality effect was a very strong one, however, it would probably have shown up with these altered conditions as well.

Although intelligence and the personality variables investigated in this study showed only slight effects on children's perceptions of meaning, nevertheless there was a great amount of variability in the perception measures within conditions, especially for the more ambiguous content-intonation combinations. This variability between children, coupled with the relatively great amount of within-subject consistency of perceptions found between sessions A and B, indicates that there may be other determinants of individual differences in such perceptions which the present study failed to measure.

It seems probable that children's previous exposure to various types, patterns, and styles of verbal reinforcement is the principal determinant of these perceptual differences; for young children it could be expected that reinforcement styles used by their parents would

be dominant among the determinants. While no research has been done on this point directly, studies by Cairns (1963), Patterson, Littman and Hinsey (1964) and Heilbrun and Gillard (1966) have demonstrated relationships between parental behavioral styles and children's responsiveness to social reinforcers. That parental styles of reinforcement, in turn, may be differentiated by social class has been demonstrated by Hess and Shipman (1965; showing middle-class mothers to use more praise than lower-class mothers) and has been suggested by Wiener (1966; discussing his finding that intonation seemed more necessary to lower-class than middle-class children for interpreting the meaning of a reinforcer).

It would be premature to attempt to apply or generalize the results of this study to educational settings. There are several elements of difference between the typical classroom (or even tutor-pupil) situation and the experimental conditions of this study which might influence some of the present findings. Perhaps the most important is a difference in the child's familiarity with the reinforcing agent. In a classroom, a child has the opportunity, through the course of a semester or a year, to learn the teacher's reinforcement style. He also has the opportunity to use additional cues which may accompany an evaluation (facial expression, posture, gestures, etc.) For these reasons it is possible that if a similar study were to be done in a classroom, or even in an experimental setting using the recorded voice of a teacher familiar to the children, with her characteristic evaluation statements (perhaps taped in classroom sessions), a smaller amount of perceptual variation might be found. Such an attempt at extension should precede more than tentative attempts at practical applications.

Results of the present study do lend themselves to certain implications for educational practice, however, assuming that they might be found to generalize to classroom situations.

Teachers make great use of verbal evaluations in the classroom, usually without the opportunity of getting immediate feedback from the children about what they perceived the statements to mean. It might be suggested that teachers should keep in mind the possibility that different children may interpret their comments differently, especially when the comments are not clearly positive or clearly negative in content and intonation. It is likely that often comments which teachers intend to be neutral or noncommital are actually perceived as praise by some children, and as criticism by others.

Besides trying to avoid using evaluations susceptible to various interpretations, teachers might try to learn how the different children in their classes interpret and respond to their various comments. While this kind of individual attention is not easy to give, and there may be difficulties in developing adequate methods for assessing such perceptions in classroom situations, the utilization of such assessments could

ultimately increase the effectiveness of the teacher's use of verbal evaluations to direct and stimulate children's learning.[1]

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[1] For a discussion of some possible additional implications of teachers' use of verbal evaluation in classrooms, with particular reference to the classroom social structure, see Solomon and Rosenberg, 1964.

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APPENDIX A. -- Achievement-related Affect Scale

The authors developed the Achievement-related Affect scale because there is presently no standardized children's group test of need for achievement. On the assumption that achievement motivation contains elements of behavioral striving for success and of affect associated with both success and failure, it was decided to construct items which might tap all of these. In order to get a measure which might be generalizable across situations, some of the items dealt with school, some with peer competition in games and sports, and others with individual achievement efforts; some involved externally defined achievement standards, while others involved internal standards. The final scale was composed of twenty items.

To avoid confounding achievement-related affect with an agreeing response tendency, ten of the items were so worded that "yes" constituted an aff-ach answer, while for the other ten, "no" did so. An attempt was made to minimize possible confounding effects of social desirability by constructing some items for which an aff-ach answer conflicted with socially approved behavior (i.e. good sportsmanship). The list of items used in this scale can be found in Table 10.

Because this measure constituted a relatively minor portion of the total study, it was decided that lengthy pretesting of the scale, with assessment of validity and reliability, would not be done prior to its use in the present investigation, but that data obtained in the study would be used to assess the worth of the measure and the possibilities of further refinement. Table 11 shows correlations among individual item scores and total scores. Inspection of these correlations suggests that the measure is not unitary; there is some indication that the items tend to cluster in terms of situational elements (items dealing with games, items dealing with school). In conjunction with other work recently reported concerning situational specificity of achievement-related behavior (Solomon, in press), these findings indicate that it might be profitable to develop an instrument which would measure children's motivation for achieving or striving in a series of situations, with separate measures for each situation, or situational parameter.

Table 10. -- Questions Used in the Achievement-Related Affect Scale

Circle One:

YES NO 1. If I have done my best, losing a game doesn't bother me.

YES NO 2. If I can't learn something easily, I feel bad and want to try harder.

YES NO 3. When I play a game with a friend, it doesn't matter to me if I win.

YES NO 4. I get very disappointed when I don't get a high grade on a test.

YES NO 5. I like trying to learn a new sport better than playing one I already know.

YES NO 6. If I have a good time making something, I don't care how well it turns out.

YES NO 7. When I play a game, I don't enjoy it much unless I am winning.

YES NO 8. When I work a puzzle, I don't mind stopping even if I haven't figured it out.

YES NO 9. When my friends and I are telling jokes, I'm happiest if mine are the funniest.

YES NO 10. In school, I don't care much if my answer is better than someone else's.

YES NO 11. When something I make turns out badly, I don't want to try it again.

YES NO 12. I feel very unhappy when I hand in school work that I know isn't very good.

YES NO 13. When I can't understand something my teacher explains, I don't worry about it much.

YES NO 14. When I draw a picture, I enjoy trying ways of improving it.

YES NO 15. When I play a game and don't win I sometimes get angry.

YES NO 16. When a friend beats me at a game, I don't mind because he is a friend.

Table 10 Continued

YES NO 17. If I can't understand something in a book, I want to keep working until I do.

YES NO 18. I get pleased and excited when I get good grades.

YES NO 19. When I can do something as well as my friends, I'm satisfied.

YES NO 20. If a gym teacher told me I wasn't very good at a sport, I would want to give it up.

Table 11. -- Correlations Among Achievement-Affect Questions and Total Score

Question	1	2	3	4	5	6	7	8	9	10	11
1											
2	-.15										
3	.25*	-.25*									
4	.00	.15	-.13								
5	.03	.10	-.08	.00							
6	-.01	-.10	.03	-.08	-.10						
7	-.03	.09	.06	.02	-.08	-.17					
8	.12	.05	.17	-.05	.14	.12	-.03				
9	.02	.10	-.26**	.02	-.10	-.10	.21*	-.11			
10	.12	-.17	.30**	-.07	.01	.06	-.11	.12	-.11		
11	-.12	-.16	-.08	-.19	-.04	-.02	-.15	-.07	-.03	-.19	
12	-.16	.20*	-.21*	.15	.06	.12	.10	.01	.14	-.29**	-.08
13	-.06	.10	-.11	.08	.00	.14	.00	.03	.01	.03	-.11
14	.03	.17	-.02	.05	.07	-.21*	.05	-.13	.01	-.06	.07
15	.12	-.02	-.07	.15	-.01	.01	.19	-.01	.17	.06	.06
16	.19	.08	.01	-.09	-.15	.13	.28**	.00	.05	.17	-.19
17	-.12	.16	-.06	-.15	.02	-.05	-.12	-.07	-.00	-.04	-.07
18	.17	-.06	.08	-.10	-.09	-.12	-.06	-.07	.04	-.08	-.12
19	.12	-.01	.01	.08	-.03	-.01	-.08	.12	-.07	-.01	-.17
20	.02	.09	.00	.05	-.09	-.01	-.30**	.02	-.14	-.06	.11
Total	.40**	.21*	.22*	.18	.14	.23*	.22*	.38**	.22*	.26**	-.10

Table 11. (continued)

Question	12	13	14	15	16	17	18	19	20	TOT
12										
13	.02									
14	-.03	.07								
15	.02	-.04	-.03							
16	.01	.05	-.08	.29**						
17	.17	.05	-.15	-.24*	-.17					
18	-.08	.08	-.05	.02	-.01	.06				
19	-.04	.00	-.18	.05	.10	-.28**	.06			
20	.09	.00	.15	.19	-.12	.22*	-.06	-.11		
TOT	.23*	.32**	.13	.41**	.40**	.05	.02	.08	.08	

* $p < .05$

** $p < .01$

Appendix B. -- Method of Selection and Lists of Reinforcers

A list of 76 statements which are commonly used as verbal evaluations, or reinforcers, was devised. This list was given to 15 adult judges, who were asked to rate the items as being positive, negative, or neutral. The 18 items (6 for each content level) which had achieved the best inter-judge agreement were selected and assigned to be used in session A, session B or both A and B, depending on their appropriateness in the situations.

The final lists are reproduced below. Each comment was presented to subjects with three different intonations, pleased, indifferent and displeased. The investigators judged as to the adequacy with which the spoken comments represented the appropriate intonation levels.

CONTENT	SESSION A	SESSION B
positive		
1.	Excellent.	Excellent.
2.	Very good.	Very good.
3.	I like that.	That's the way.
4.	That's coming along well.	You're doing better.
neutral		
1.	Take your time	Take your time.
2.	I see.	I see.
3.	Interesting.	Uh huh.
4.	That could have been worse.	Try another one.
negative		
1.	Not very good.	Not very good.
2.	Pretty bad.	Pretty bad.
3.	Not that way.	That's wrong.
4.	You're not too good at this.	That was a poor choice.

Appendix C. -- Interrelationships among Achievement-related and Personality Variables

Although it was not directly relevant to the main hypotheses of the present study, the possible relationships among the various personality variables and the intellectual and school-related measures obtained from school records were important enough to be considered alone. Accordingly, correlations were run between the following variables: Intellectual Achievement Responsibility, positive events (IAR +); Intellectual Achievement Responsibility, negative events (IAR -); IAR total; Social Desirability (Soc Des); Anxiety (Anx, from the Children's Manifest Anxiety Scale); Scores on the Lie Scale of the Anxiety test; Achievement-related Affect (Ach-aff); IQ, as measured by the Kuhlman Anderson test; 4th grade grade point average (GPA, from grades in reading, language, spelling, writing, arithmetic, social studies, and science); and scores from the Metropolitian Achievement Test on Word Knowledge (Wd Knw), Word Discrimination (Wd Dis), Reading (Red), Spelling (Spl), Arithmetic Computation (Com), Arithmetic Problem Solving (Pro Sol), and Language (Lan). The results of these tests are shown in Table 12. Especially notable are the high correlations among IQ and the other achievement-related variables.

Table 12 -- Correlations Among Personality and Achievement Measures

	IAR +	IAR -	IAR TOT	Soc Des	Anx	Lie	Ach Aff	IQ	GPA	Wd Knw	Wd Dis	Red	Spl	Com	Pro Sol	Lang
IAR+																
IAR-	.15															
IAR TOT	.63**	.86**														
Soc Des	.29**	.04	.18													
Anxiety	-.19	.01	-.09	-.28**												
Lie	.25*	.14	.24*	.59**	-.13											
Ach-Aff	.13	.21*	.24*	-.02	.06	.02										
IQ	.20*	.10	.18	-.01	.13	-.20*	.11									
GPA	.14	-.06	.03	.04	-.18	-.12	-.02	.60**								
Wd Knw	.02	-.02	-.01	-.08	-.01	-.23*	.13	.60**	.54**							
Wd Dis	.14	.10	.15	-.03	-.14	-.24*	.05	.67**	.56**	.75**						
Read	.18	.06	.14	.05	-.14	-.16	.01	.64**	.70**	.74**	.69**					
Spell	.21*	.16	.23*	.03	-.10	-.13	.02	.55**	.55**	.76**	.77**	.67**				
Comp	.17	-.01	.08	.00	-.20*	-.17	-.13	.42**	.67**	.40**	.49**	.54**	.46**			
Pro Sol	.15	-.01	.07	-.12	-.07	-.26*	-.10	.54**	.64**	.60**	.55**	.69**	.56**	.77**		
Lang	.21*	.11	.20	.09	-.08	-.03	.05	.47**	.51**	.70**	.63**	.67**	.78**	.46**	.50**	

* $p < .05$

** $p < .01$

Appendix D. -- Supplementary Tables

Table 13. -- Summary of Analyses of Variance Involving IAR

		Sess A Ques 1		Sess A Ques 2		Sess A Ques 3		Sess B Judg	
Source	df	MS	F	MS	F	MS	F	MS	F
IAR (A)	2	17.98	4.10*	18.74	2.07	38.18	1.86	.82	<1.00
Order (B)	2	.46	<1.00	8.21	.91	39.72	1.94	1.99	2.15
A x B	4	5.50	1.25	5.01	<1.00	9.21	<1.00	.66	<1.00
Error	87	4.39		9.07		20.48		.92	
Content (C)	2	6299.68	1721.22***	6018.21	1246.41***	1969.84	232.34***	868.10	818.19***
A x C	4	11.74	3.21*	2.05	<1.00	5.21	<1.00	1.22	1.15
B x C	4	.08	<1.00	1.63	<1.00	22.60	2.67*	5.09	4.80**
A x B x C	8	2.53	<1.00	8.39	1.74	6.50	<1.00	.66	<1.00
Error x C	174	3.66		4.83		8.48		1.06	
Inton. (D)	2	92.64	39.25***	114.93	53.76***	94.95	29.73***	13.80	29.05***
A x D	4	3.68	1.56	1.95	<1.00	.18	<1.00	.94	1.99
B x D	4	2.37	1.00	2.03	<1.00	4.64	1.45	.44	<1.00
A x B x D	8	3.35	1.42	.88	<1.00	4.91	1.54	.38	<1.00
Error x D	174	2.36		2.14		3.91		.48	
C x D	4	106.38	109.67***	97.15	58.50***	66.00	38.76***	4.56	15.62***
A x C x D	8	.60	<1.00	2.04	1.23	2.36	1.38	.36	1.23
B x C x D	8	1.38	1.42	.87	<1.00	1.22	<1.00	.58	2.00
A x B x C x D	16	1.43	1.47	1.15	<1.00	1.61	<1.00	.20	<1.00
Err x C x D	348	.97		1.66		1.70		.29	

*** p <.001

** p <.01

* p <.05

Table 14. -- Summary of Analyses of Variance Involving Social Desirability

		Sess A Ques 1		Sess A Ques 2		Sess A Ques 3		Sess B Judg	
Source	df	MS	F	MS	F	MS	F	MS	F
Soc Des (A)	2	.52	<1.00	4.37	<1.00	20.84	1.11	1.92	2.21
Order (B)	2	.94	<1.00	4.82	<1.00	35.54	1.89	2.37	2.72
A x B	4	9.92	2.18	9.99	1.10	50.35	2.68*	1.21	1.31
Error	87	4.55		9.08		18.80		.87	
Content (C)	2	6469.10	1662.79***	6093.95	1240.60***	2034.23	236.37***	847.36	830.74***
A x C	4	2.02	<1.00	7.20	1.47	4.25	<1.00	1.74	1.71
B x C	4	.80	<1.00	.84	<1.00	18.79	2.18	4.74	4.65**
A x B x C	8	2.65	<1.00	3.06	<1.00	4.77	<1.00	1.18	1.16
Error x C	174	3.89		4.91		8.61		1.02	
Inton. (D)	2	95.92	40.36***	119.10	59.10***	106.76	33.38***	11.30	23.54***
A x D	4	2.02	<1.00	3.49	1.73	7.07	2.21	.43	<1.00
B x D	4	3.37	1.42	1.90	<1.00	4.55	1.42	.28	<1.00
A x B x D	8	1.81	<1.00	2.67	1.32	.86	<1.00	.80	1.67
Error	174	2.38		2.01		3.20		.48	
C x D	4	111.13	122.12***	100.59	59.81***	66.56	38.42***	4.06	14.50***
A x C x D	8	1.52	1.66	.57	<1.00	.69	<1.00	.26	<1.00
B x C x D	8	1.39	1.53	.91	<1.00	1.32	<1.00	.52	1.86
A x B x C x D	16	1.54	1.69	1.54	<1.00	1.72	<1.00	.51	1.82
Err x C x D	348	.91		1.68		1.73		.28	

*** p < .001

** p < .01

* p < .05

Table 15. -- Summary of Analyses of Variance Involving Anxiety

		Sess A Ques 1		Sess A Ques 2		Sess A Ques 3		Sess B Judg	
Source	df	MS	F	MS	F	MS	F	MS	F
Anxiety (A)	2	5.76	1.31	2.81	<1.00	19.25	<1.00	1.92	2.40
Order (B)	2	.16	<1.00	8.11	<1.00	33.88	1.68	2.47	3.09
A x B	4	10.50	2.38	18.11	2.08	17.10	<1.00	2.95	3.69*
Error	87	4.41		8.72		20.20		.80	
Content (C)	2	6214.78	1626.91***	5875.66	1208.80***	1955.70	231.06***	845.54	845.54***
A x C	4	6.47	1.69	6.29	1.29	16.47	1.95	2.04	2.04
B x C	4	.94	<1.00	1.07	<1.00	14.51	1.71	4.26	4.26**
A x B x C	8	1.39	<1.00	4.22	<1.00	2.00	<1.00	1.16	1.16
Error x C	174	3.82		4.86		8.46		1.00	
Inton. (D)	2	89.67	37.52***	114.56	53.90***	97.46	29.90***	12.92	25.84***
A x D	4	1.40	<1.00	1.15	<1.00	3.50	1.07	.02	<1.00
B x D	4	3.26	1.36	2.32	1.09	3.54	1.09	.22	<1.00
A x B x D	8	2.13	<1.00	1.52	<1.00	1.59	<1.00	.40	<1.00
Error x D	174	2.39		2.13		3.26		.50	
C x D	4	107.80	107.80***	98.60	59.73***	67.70	39.83***	4.06	14.00***
A x C x D	8	.87	<1.00	1.67	1.01	.67	<1.00	.35	1.21
B x C x D	8	.83	<1.00	.95	<1.00	1.12	<1.00	.63	2.18*
A x B x C x D	16	1.24	1.24	1.65	1.00	2.42	1.42	.26	<1.00
Err x C x D	348	1.00		1.65		1.70		.29	

*** $p < .001$

** $p < .01$

* $p < .05$

Table 16. -- Summary of Analyses of Variance Involving Ach-Aff

		Sess A Ques 1		Sess A Ques 2		Sess A Ques 3		Sess B Judg	
Source	df	MS	F	MS	F	MS	F	MS	F
Aff-Ach (A)	2	.21	<1.00	19.63	2.25	31.69	1.68	.18	1.00
Order (B)	2	1.66	<1.00	1.42	<1.00	25.02	1.33	1.96	2.06
A x B	4	8.40	1.83	6.82	<1.00	39.10	2.08	.36	<1.00
Error	87	4.59		8.73		18.82		.95	
Content (C)	2	6366.88	1684.36***	5992.00	1209.60***	2034.00	247.67***	869.00	819.81***
A x C	4	5.04	1.33	5.61	1.13	12.12	1.48	.30	<1.00
B x C	4	1.22	<1.00	.67	<1.00	18.45	2.25	4.56	4.30**
A x B x C	8	3.72	<1.00	3.11	<1.00	10.41	1.27	1.32	1.24
Error x C	174	3.78		4.95		8.21		1.06	
Inton. (D)	2	92.66	39.77***	114.44	54.30***	106.61	32.96***	14.30	31.09***
A x D	4	1.98	<1.00	1.96	<1.00	4.49	1.39	.93	2.02
B x D	4	2.84	1.22	1.58	<1.00	4.68	1.45	.38	<1.00
A x B x D	8	3.07	1.32	1.66	<1.00	1.58	<1.00	.77	1.67
Error x D	174	2.33		2.11		3.23		.46	
C x D	4	107.02	115.08***	97.23	59.48***	65.58	37.53***	4.96	16.53***
A x C x D	8	1.20	1.29	1.59	<1.00	.74	<1.00	.14	<1.00
B x C x D	8	1.34	1.44	.83	<1.00	1.26	<1.00	.49	1.63
A x B x C x D	16	1.14	1.23	1.95	1.19	1.37	<1.00	.23	<1.00
Err x C x D	348	.93		1.63		1.75		.30	

* $p < .05$
** $p < .01$
*** $p < .001$

Table 17. -- Summary of Analyses of Variance Involving IQ

Source	df	Sess A Ques 1 MS	Sess A Ques 1 F	Sess A Ques 2 MS	Sess A Ques 2 F	Sess A Ques 3 MS	Sess A Ques 3 F	Sess B Judg MS	Sess B Judg F
IQ (A)	2	1.34	<1.00	4.95	<1.00	4.58	<1.00	1.10	1.21
Order (B)	2	1.05	<1.00	4.84	<1.00	28.65	1.35	2.10	2.31
A x B	4	1.64	<1.00	5.74	<1.00	5.96	<1.00	.79	<1.00
Error	87	6.02		9.23		21.27		.91	
Content (C)	2	6140.69	1890.04***	5685.96	1182.65***	1958.05	239.22***	873.92	832.30***
A x C	4	2.29	<1.00	7.20	1.50	18.43	2.25	1.63	1.55
B x C	4	.41	<1.00	1.16	<1.00	20.84	2.55*	4.88	4.65**
A x B x C	8	4.19	1.29	4.73	<1.00	7.65	<1.00	.78	<1.00
Error x C	174	3.25		4.81		8.19		1.05	
Inton. (D)	2	89.32	48.01***	115.38	54.56***	103.82	30.89***	13.70	27.96***
A x D	4	.85	<1.00	.28	<1.00	.68	<1.00	.29	<1.00
B x D	4	2.84	1.52	1.64	<1.00	4.43	1.32	.44	<1.00
A x B x D	8	2.04	1.10	2.30	1.09	.65	<1.00	.26	<1.00
Error x D	174	1.86		2.11		3.36		.49	
C x D	4	106.38	89.05***	96.94	57.64***	65.75	38.84***	4.64	15.47***
A x C x D	8	1.36	1.14	.93	<1.00	1.60	<1.00	.24	<1.00
B x C x D	8	1.44	1.20	1.01	<1.00	1.30	<1.00	.54	1.80
A x B x C x D	16	1.13	<1.00	1.35	<1.00	2.17	1.28	.20	<1.00
Err x C x D	348	1.19		1.68		1.69		.30	

*** p < .001

** p < .01

* p < .05

Table 18. -- Summary of Trend Tests for the Effect of Personality Variables on the Neutral Content-Intonation Cell Scores

Variable	Sess. A, Ques. 1	Sess. A, Ques. 2	Sess. A, Ques. 3	Sess. B, Judg.
IAR	Flin = 3.81 Fquad < 1.00	Flin = 1.19 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin = 5.24* Fquad < 1.00
Soc. Des.	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad = 2.63
Anxiety	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad = 1.02
Ach-Aff	Flin < 1.00 Fquad < 1.00	Flin = 2.43 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00
IQ	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad < 1.00	Flin < 1.00 Fquad = 1.54

df = 1 & 87 *$p < .05$

Table 19. -- Summary of One-way Analyses of Variance Showing Effects of Personality Measures on Content-Intonation Sensitivity.

		Sess. A, Ques. 1		Sess. A, Ques. 2		Sess. A, Ques. 3	
Source	df	ms	F	ms	F	ms	F
IAR	2	7.07	1.65	.07	< 1.00	4.88	< 1.00
Error	93	4.29		6.87		13.06	
Soc. Des.	2	1.89	< 1.00	1.26	< 1.00	18.88	1.48
Error	93	4.40		6.84		12.76	
Anxiety	2	5.79	1.34	11.54	1.74	66.78	5.70**
Error	93	4.32		6.62		11.73	
Aff Ach	2	10.04	2.38	1.89	< 1.00	4.34	< 1.00
Error	93	4.23		6.83		13.07	
IQ	2	1.57	< 1.00	4.26	< 1.00	8.00	< 1.00
Error	93	4.41		6.78		12.99	

**$p < .01$

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RETRIEVAL TERMS

600 children	concept formation
601 judgment	meaning
602 message content	perception
603 personality	verbal evaluation
604 verbal intonation	verbal reinforcement

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IDENTIFIERS

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ABSTRACT

800 Ninety-six fourth grade boys participated in a study investigating the influence
801 of personality and stimulus characteristics on perceptions of the meanings
802 of verbal evaluations, and the functioning of differentially perceived evaluations
803 as reinforcers in a learning task. Personality variables measured were anxiety,
804 locus of control, need for approval and need for achievement. Measures of rein-
805 forcer perceptions were obtained in two experimental sessions, each using 36 taped
806 comments encompassing all combinations of three levels of content (positive, neu-
807 tral and negative) and three levels of intonation (pleased, indifferent and dis-
808 pleased). In another session, subjects were given a concept learning task with
809 reinforcers selected from the earlier sessions. One control group was reinforced
810 with "excellent", an evaluation previously perceived as very positive; a second
811 control group was reinforced with "pretty bad", previously perceived as very
812 negative. A common reinforcer was used for the two experimental groups ("I see");
813 subjects in the first group previously had perceived it as positive, those in the
814 second, as negative. Content, intonation and locus of control were all found to
815 be related to perceptions of the reinforcers. Evidence was also obtained that
816 perception of a reinforcer related to its effects on learning. Implications for
817 education were discussed.
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